IS 3025-63 (2007): Methods of Sampling and Test (Physical and Chemical) for Water and Wastewater, Part 63: Oxygen Absorbed in 4 h [CHD 32: Environmental Protection and Waste Management]

BLANK PAGE

भारतीय मानक

जल और अपशिष्ट जल के नमूने लेने तथा परीक्षण (भौतिक एवं रसायन) की पद्धतियाँ

भाग 63 आक्सीजन चार घंटों में अवशोषित

(पहला पुनरीक्षण)

Indian Standard

METHODS OF SAMPLING AND TEST (PHYSICAL AND CHEMICAL) FOR WATER AND WASTEWATER

PART 63 OXYGEN ABSORBED IN 4 h

(First Revision)

ICS 13.060.50

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 2007

Price Group 2

FOREWORD

This Indian Standard (Part 63) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Environment Protection and Waste Management Sectional Committee had been approved by the Chemical Division Council.

'Oxygen absorbed in 4 h' is useful for quick assessment of pollution potential of wastewater. This requirement is useful particularly when it is not feasible to conduct Biological Oxygen Demand (BOD) test due to interference by toxic substances.

The Committee responsible for the formulation of IS 3025 : 1964 'Methods of sampling and test (physical and chemical) for water used in industry' had decided to revise the standard and publish it as separate parts. This standard is one of the different parts under the IS 3025 series of standards and supersede **51** of IS 3025.

There is no ISO Standard on the subject. This standard has been formulated based on the indigenous practices prevalent in the field in India.

The composition of the Committee responsible for formulation of this standard is given at Annex A.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

METHODS OF SAMPLING AND TEST (PHYSICAL AND CHEMICAL) FOR WATER AND WASTEWATER

PART 63 OXYGEN ABSORBED IN 4 h

(First Revision)

1 SCOPE

This standard (Part 63) prescribes method of test for determination of oxygen absorbed in 4 h in water and wastewater.

2 REFERENCES

The standards listed below contain provisions which through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
3025 (Part 1) : 1987	Methods of sampling and test (physical and chemical) for water and wastewater : Part 1 Sampling (*first revision*)
7022 (Part 1) : 1973	Glossary of terms relating to water, sewage and industrial effluents : Part 1
7022 (Part 2) : 1979	Glossary of terms relating to water, sewage and industrial effluents : Part 2

3 TERMINOLOGY

For the purpose of this standard, definitions given in IS 7022 (Part 1) and IS 7022 (Part 2) shall apply.

4 SAMPLING AND PRESERVATION

Sampling and sample preservation shall be done as prescribed in IS 3025 (Part 1).

5 PRINCIPLE

Oxygen absorbed in 4 h is determined by estimating amount of standard potassium permanganate solution consumed by the sample kept under specific conditions in 4 h.

This test is useful for quick assessment of pollution level of wastewater, particularly when it is not feasible to conduct BOD test due to interference of toxic substances. It is useful for laboratories with limited facilities.

6 RANGE AND APPLICABILITY

The range of the method depends upon the nature of sample as well as the requirement of potassium permanganate standard solution. The minimum detection limit of this method is 0.4 mg/l.

7 INTERFERENCE

Excessive amount of residual chlorine interfere with the test. Inorganic substances such as nitrite, sulphide and ferrous iron react with potassium permanganate and get oxidized.

8 APPARATUS

8.1 Incubator or Water-Bath — Suitable to maintain at 37 ± 1°C.

8.2 Air Oven — Suitable for use at 105 ± 1°C.

9 REAGENTS

9.1 Stock Potassium Permanganate Solution — Dissolve 3.951 g of potassium permanganate (dried at 105°C) in distilled water and make up to 1 000 ml. This solution shall be kept in the dark and its strength shall be checked periodically.

9.2 Standard Potassium Permanganate Solution — N/80 — This solution shall be prepared immediately before use by suitable dilution of stock potassium permanganate solution. One millilitre of this solution is equivalent to 0.1 mg of oxygen.

9.3 Dilute Sulphuric Acid — Add slowly 50 ml of concentrated sulphuric acid to 130 ml of distilled water, cool and make up to 200 ml with distilled water. Add standard permanganate solution until a very faint pink colour persists after 4 h.

9.4 Potassium Iodide Crystals

9.5 Stock Sodium Thiosulphate Solution — Dissolve

31.2 g of sodium thiosulphate and 6 g of sodium bicarbonate in water and make up to 1 000 ml.

9.6 Standard Sodium Thiosulphate Solution — N/80 — This shall be prepared by suitable dilution of stock sodium thiosulphate solution. Before using the solution the strength shall be checked by titration with standard potassium permanganate solution.

9.7 Starch Indicator Solution

10 PROCEDURE

Place 250 ml of the well-mixed sample into a clean, glass-stoppered bottle of 400 ml capacity. Add 10 ml dilute sulphuric acid, followed by an accurately measured volume (*see* Note) of standard potassium permanganate solution. Mix the contents by gentle rotations and place in a water-bath or incubator at 37±1°C for 4 h. If the sample contains much suspended matter, it shall be mixed by gentle rotation several times during the period of incubation. At the end of 4 h, cool to about 15°C, add a few crystals of potassium iodide and titrate in the bottle with standard sodium thiosulphate solution, using a few drop of starch indictor solution. A blank for oxygen absorbed in 3 min shall be carried out. Express the result to the nearest 0.05 mg/l.

NOTE — The measured volume of standard potassium permanganate solution taken shall be not less than 10 ml, but shall be such that at the end of 4 h, the amount remaining unchanged is between 5 and 15 ml. If it is found that the volume required was anticipated incorrectly, the determination shall be repeated.

11 CALCULATION

Oxygen absorbed in 4 h, mg/l = $0.4V$

where

V = volume of standard potassium permanganate solution consumed in reaction with the sample, in ml.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Environment Protection and Waste Management Sectional Committee, CHD 32

Organization	*Representative(s)*
In personal capacity (*40/14, Chitranjan Park, New Delhi 110019*)	PROF DILIP BISWAS (***Chairman***)
Bhabha Atomic Research Centre, Mumbai	DR (SHRIMATI) G. G. PANDIT DR I. V. SARADHI (*Alternate*)
Bharat Heavy Electricals Limited, Haridwar	DR N. G. SHRIVASTAVA
Cement Manufacturers' Association, New Delhi	DR K. C. NARANG
Central Fuel Research Institute, Dhanbad	DR L. C. RAM
Central Leather Research Institute, Chennai	DR S. RAJAMANI
Central Pollution Control Board, New Delhi	DR S. D. MAKHIJANI DR C. S. SHARMA (*Alternate* I) DR S. K. TYAGI (*Alternate* II)
Central Road Research Institute, New Delhi	SHRIMATI ANURADHA SHUKLA
Confederation of Indian Industries, New Delhi	SHRI A. K. GHOSE SHRI R. P. SHARMA (*Alternate*)
Crop Care Federation of India, New Delhi	SHRI P. N. PARMESHAWARAN
Department of Civil Engineering, Indian Institute of Technology, New Delhi	DR MUKESH KHARE DR ATUL MITTAL (*Alternate* I) DR ARVIND NEMA (*Alternate* II)
Delhi College of Engineering, Delhi	DR RAKESH MEHROTRA SHRI V. K. MINOCHA (*Alternate* I) DR (SHRIMATI) A. MANDAL (*Alternate* II)
Delhi Jal Board, Delhi	CHIEF ENGINEER (SEWER)
Directorate General Factory Advice Service and Labour Institute, Mumbai	SHRI S. S. GAUTAM SHRI BRIJ MOHAN (*Alternate*)
Directorate General of Health Services, New Delhi	DR (SHRIMATI) MADHURI SHARMA
Engineers India Limited, New Delhi	SHRI B. B. LAL SHRI SUSHEEL SADH (*Alternate*)

Organization	*Representative(s)*
Envirotech Instruments Private Limited, New Delhi	SHRI RAKESH AGARWAL DR RAJENDRA PRASAD (*Alternate*)
Federation of Indian Chambers of Commerce & Industry (FICCI), New Delhi	MS ANTARA ROY
Gujarat Pollution Control Board, Ahmedabad	SHRI D. C. DAVE
Hindustan Lever Limited, Mumbai	SHRI B. B. DAVE SHRI ADITYA JHAVAR (*Alternate*)
Indian Centre for Plastics in the Environment, Mumbai	SHRI S. P. CHAKRABORTY SHRI T. K. BANDYOPADHAYAY (*Alternate*)
Indian Chemical Manufacturers' Association, Mumbai	SHRI PRAKASH WAGALE SHRI A. A. PANJWANI (*Alternate*)
Indian Council of Agricultural Research, New Delhi	DR R. C. MAHESHWARI
Indian Council of Medical Research, New Delhi	SHRI H. N. SAIYAD
Indian Oil Corporation Limited, Faridabad	DR M. P. SINGH
IPCL, Vadodara	SHRI ANUPAM DESAI SHRI MIHIR BANERJI (*Alternate*)
Industrial Toxicology Research Centre, Lucknow	DR S. K. BHARGAVA
Ministry of Defencce (R & D), DRDO, New Delhi	SHRI J. C. KAPOOR
Ministry of Environment and Forests, New Delhi	REPRESENTATIVE
Ministry of Non-conventional Energy Sources, New Delhi	SHRI VINOD KUMAR JAIN
Municipal Corporation of Delhi, Delhi	SHRI RAVI DASS SHRI SURENDER PAL (*Alternate*)
Municipal Corporation of Greater Mumbai, Mumbai	DEPUTY CITY ENGINEER CIVIL (ENVT) DEPUTY EXECUTIVE ENGINEER (EMISSION INVENTORY GROUP) (*Alternate*)
National Institute of Occupational Health (ICMR), Ahmedabad	DR V. KRISHNA MURTHY DR A. K. MUKHERJEE (*Alternate*)
National Environmental Engineering Research Institute, Nagpur	DR V. I. PANDIT DR TAPAN NANDY (*Alternate*)
National Thermal Power Corporation Limited, New Delhi	SHRI R. GOPAL
NCCM, New Delhi	SHRI M. S. BHAGWAT DR S. N. PATI (*Alternate*)
Reliance Industries Limited, Mumbai	DR E. SUNDERASAN DR U. K. SAROOP (*Alternate*)
Shriram Institute of Industrial Research, New Delhi	SHRI V. G. K. NAIR DR JAGDISH KUMAR (*Alternate*)
SGS India Limited, Chennai	SHRI S. RAVI
Steel Authority of India Limited, New Delhi	SHRI V. M. SHASTRI SHRI K. B. LAL (*Alternate*)
The Energy and Resources Institute, New Delhi	COL (RETD) R. K. JOHRI DR SUNIL PANDEY (*Alternate*)
Thapar Centre for Industrial Research and Development, Patiala	DR MAHESHWAR ROY DR S. K. CHAKRABORTY (*Alternate*)
The Fertilizer Association of India, New Delhi	DR (SHRIMATI) B. SWAMINATHAN DR S. NAND (*Alternate*)
Town and Country Planning Organization, Ministry of Urban Development, New Delhi	SHRI K. K. JOADDER DR SANTOSH VIDHYA DHARAN (*Alternate*)
BIS Directorate General	DR U. C. SRIVASTAVA, Scientist 'F' & Head (CHD) [Representing Director General (*Ex-officio Member*)]

Member Secretary
SHRI N. K. PAL
Scientist 'E' (CHD), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc: No. CHD 32 (1335).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *website* : www.bis.org.in

Regional Offices:		Telephones
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	2323 7617, 2323 3841
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi, KOLKATA 700054	2337 8499, 2337 8561, 2337 8626, 2337 9120
Northern	: SCO 335-336, Sector 34-A, CHANDIGARH 160022	260 3843, 260 9285
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	2254 1216, 2254 1442, 2254 2519, 2254 2315
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East), MUMBAI 400093	2832 9295, 2832 7858, 2832 7891, 2832 7892

Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. PARWANOO. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.

Printed at Simco Printing Press, Delhi